

**ABSTRACT**

Apparatus and methods are provided. Print-mark data corresponding to a print mark on a hardcopy of printed material is extracted from data corresponding to the hardcopy of printed material. The print-mark data is analyzed to quantify printing artifacts of the print mark resulting from printing variations occurring during printing of the hardcopy of printed material. The quantified printing artifacts are encrypted, and the encrypted printing artifacts are encoded into data corresponding to a machine-readable identifier. The machine-readable identifier is printed from the data corresponding to the machine-readable identifier on the hardcopy of printed material.